PERSISTENCE OF PRECIPITATION TREND

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Overview

- **Motivations and Objectives**
- **Scope of Study**
- **Data Used in Study**
- **Results**
- **Summary and Conclusions**

Motivations and Objectives

- **Motivations**
  - **Triggered by unusually dry winter this year**
  - **Gain information about future precipitation**
  - **Improve water supply forecast**
- **Objectives**
  - **Existence of persistence**
  - **Magnitude of persistence**

Scope of Study

- **Definition of persistence**

  the tendency that the observed precipitation trend will continue in the future

- **Focused on persistence of Oct-Jan accumulated precip to subsequent months**
- **Based on statistical analysis of historical data**
  - **Did not isolate effects such as ENSO, PDO**
  - **Did not look at stationarity of data**
    - **climate change,**
    - **station relocation, change of data collection method etc**

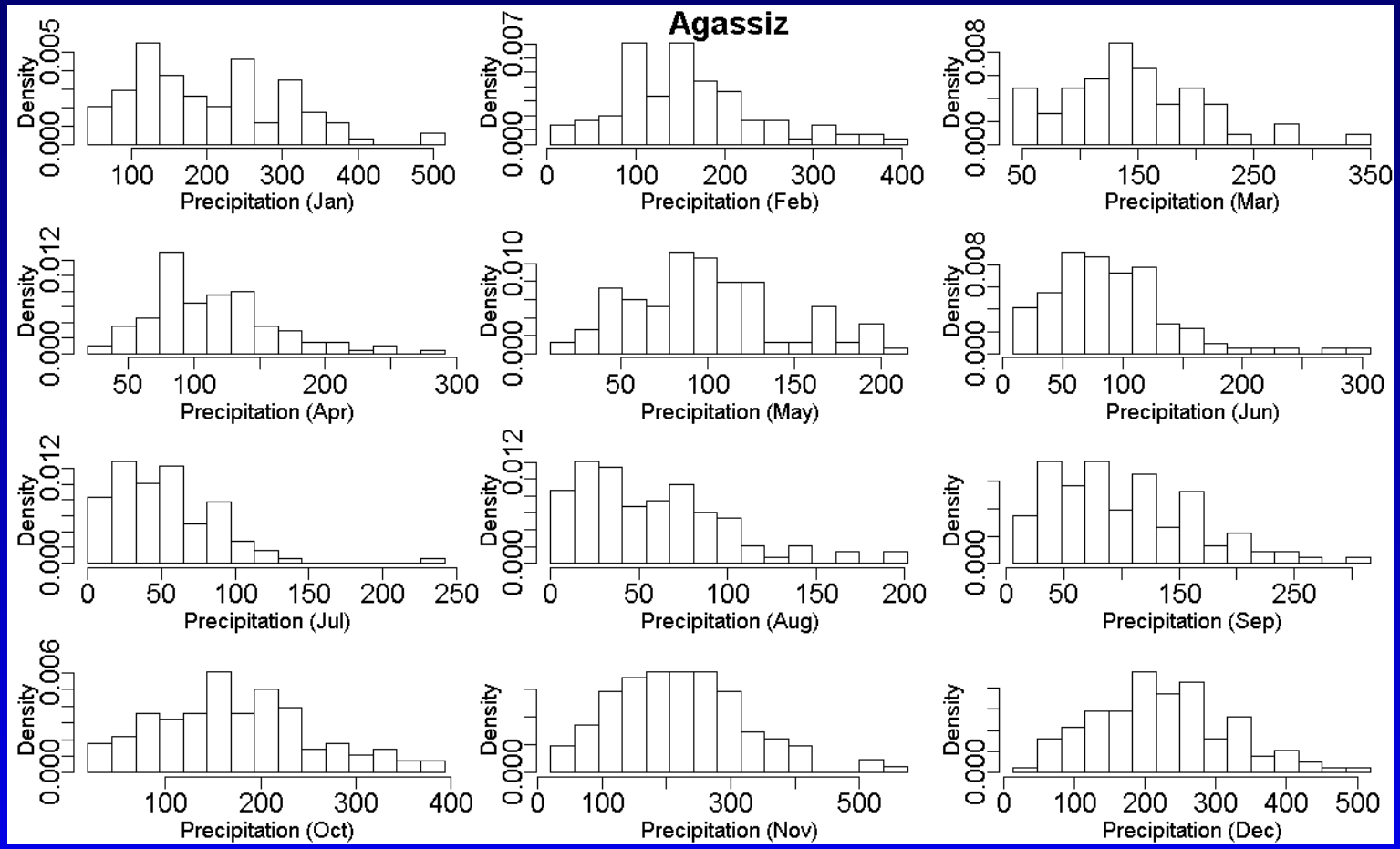
Data Used in Study

- **5 Long-term stations across British Columbia:**

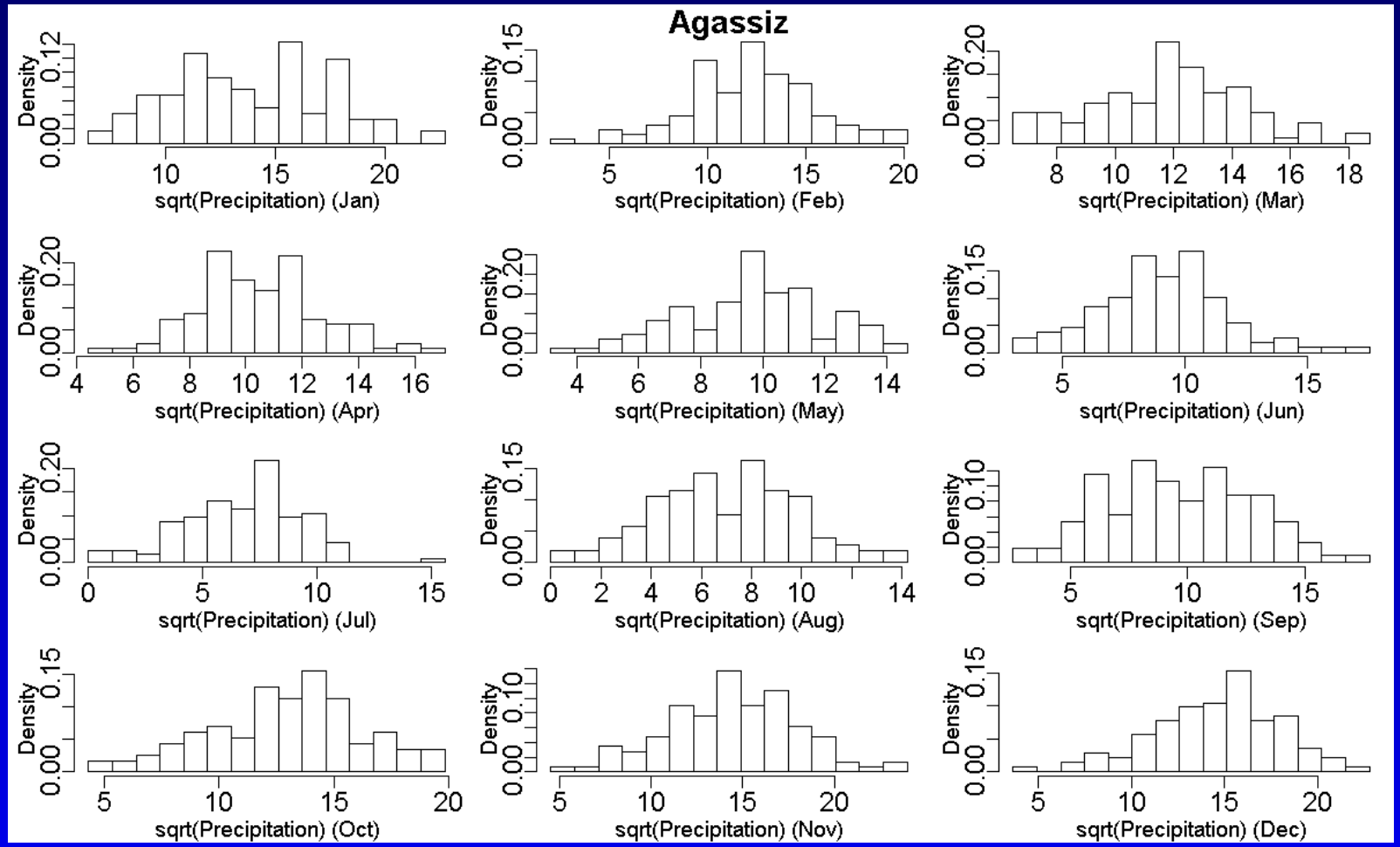
Station	Record
Agassiz	1889-2001
Creston	1912-2001
Ft St. James	1895-2001
Golden A	1902-2001
Shawnigan	1911-2001

- **Data normalized by square root transformation**

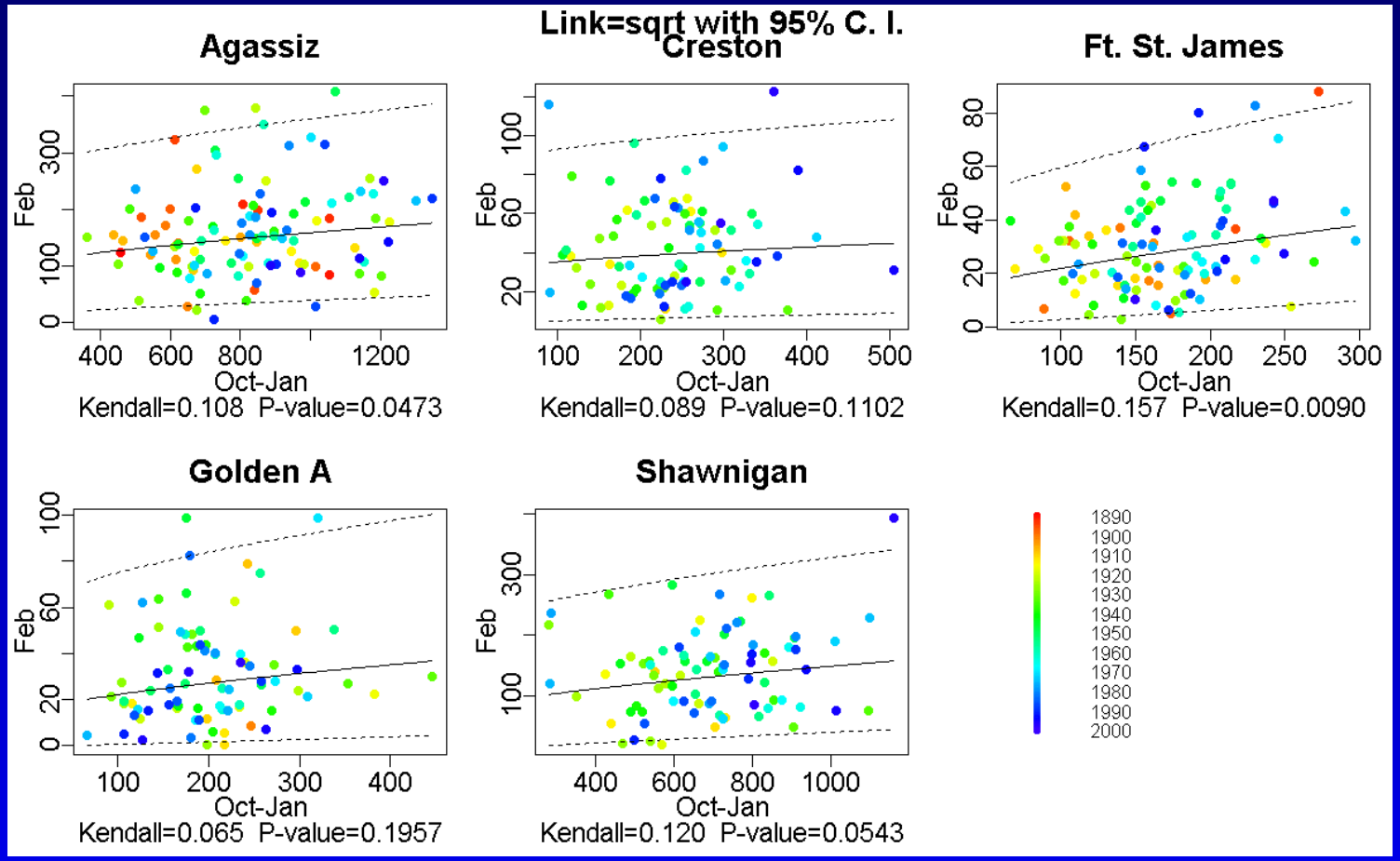
Histograms of Monthly Precip



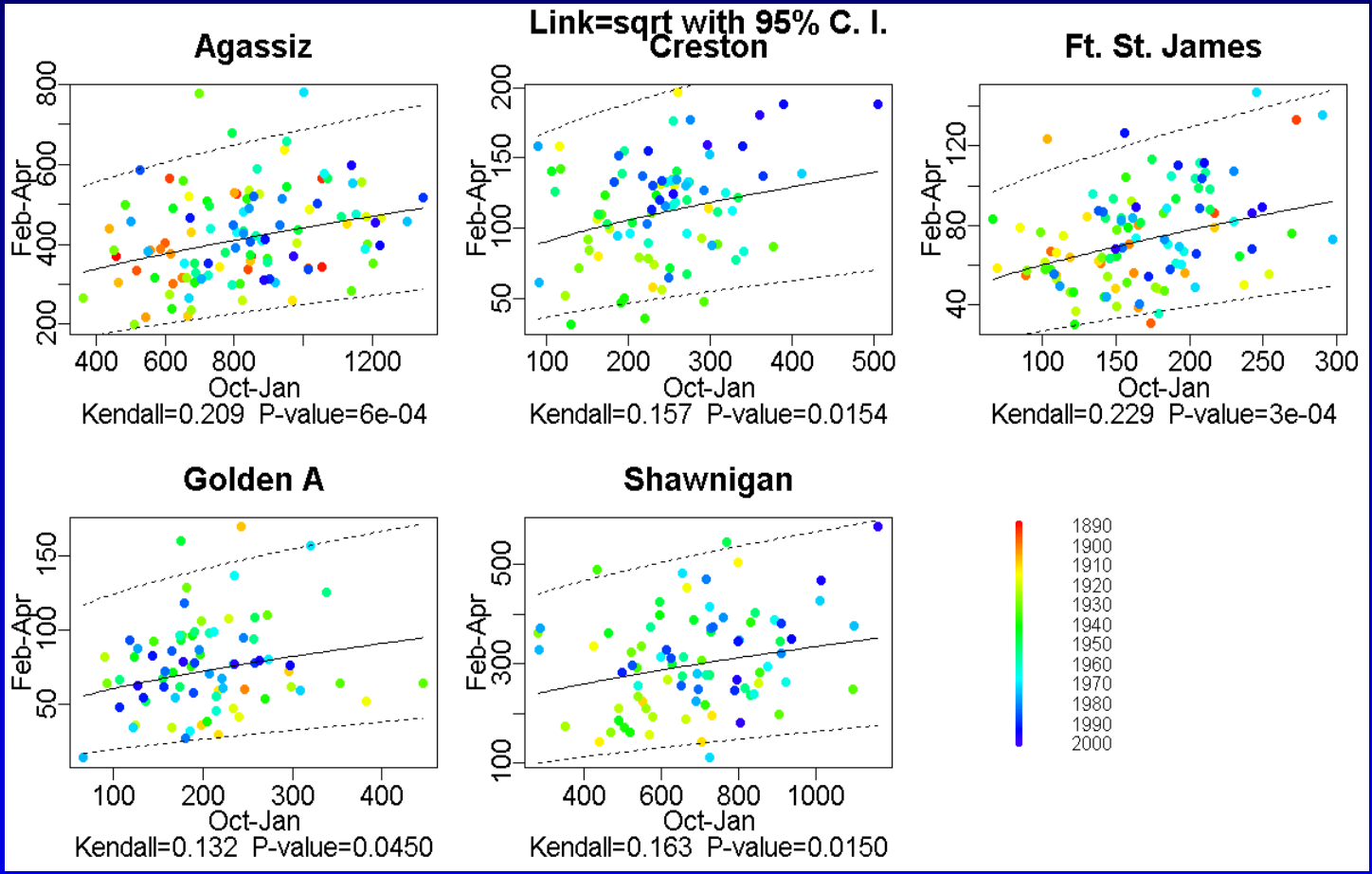
Histograms of SQRT Monthly Precip



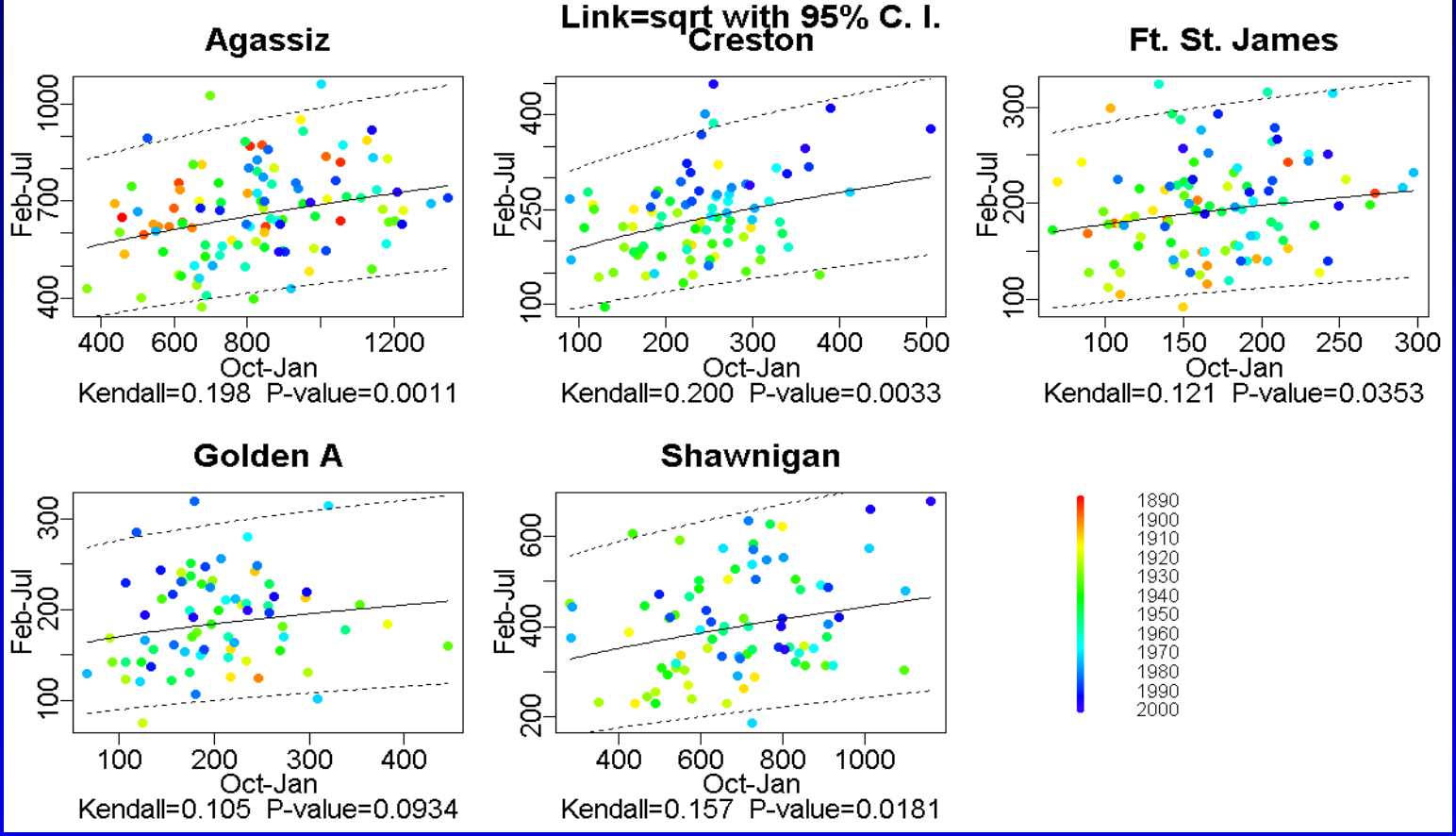
Results


Link=sqrt with 95% C. I.
Agassiz
Creston
Ft. St. James
Feb
Oct-Jan
Kendall=0.108 P-value=0.0473
Kendall=0.089 P-value=0.1102
Kendall=0.157 P-value=0.0090
Golden A
Shawnigan
Kendall=0.065 P-value=0.1957
Kendall=0.120 P-value=0.0543
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000

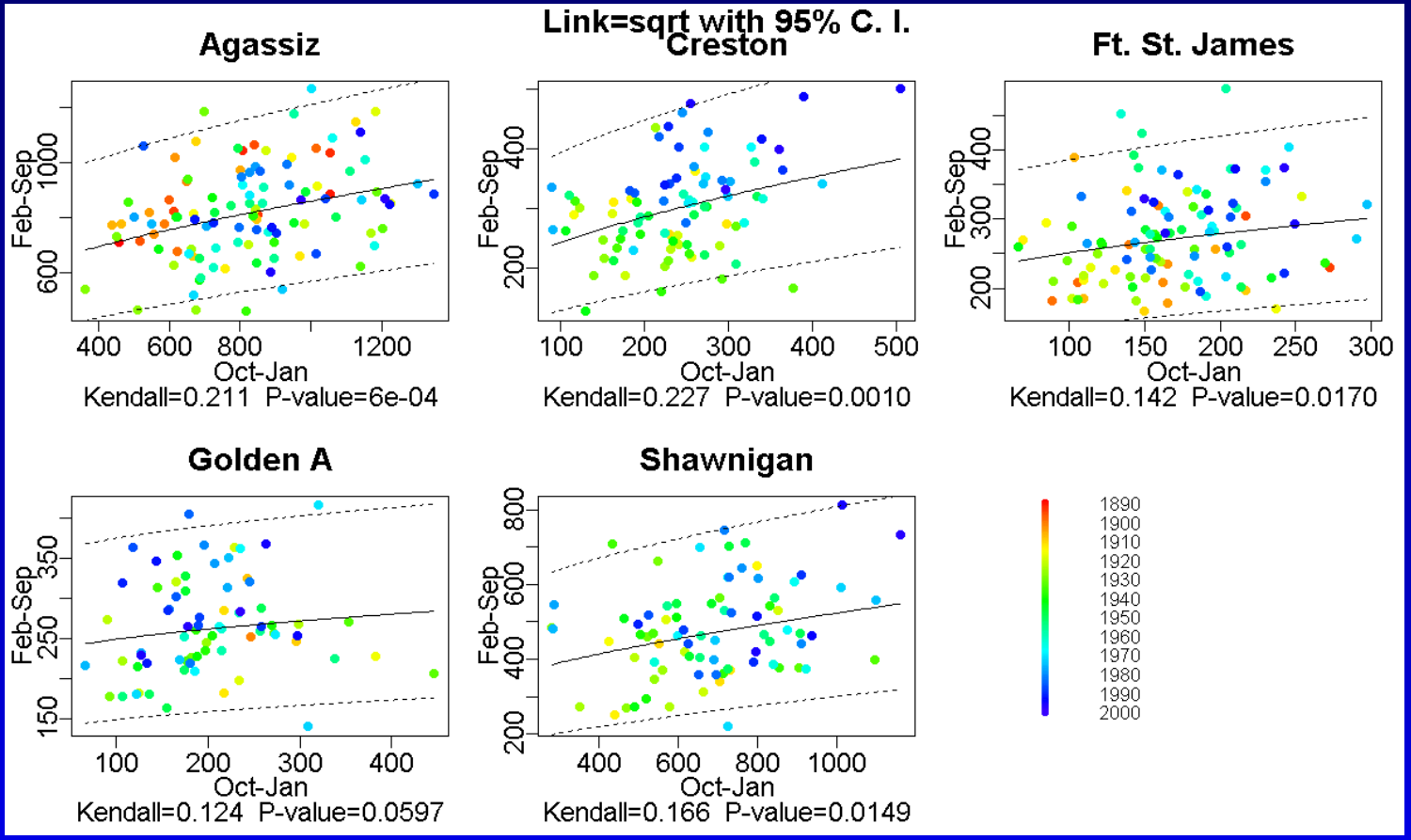
Results


Link=sqrt with 95% C. I.
Agassiz
Creston
Ft. St. James
Golden A
Shawnigan
Feb-Apr
Oct-Jan
Kendall=0.209 P-value=6e-04
Kendall=0.157 P-value=0.0154
Kendall=0.229 P-value=3e-04
Kendall=0.132 P-value=0.0450
Kendall=0.163 P-value=0.0150
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000

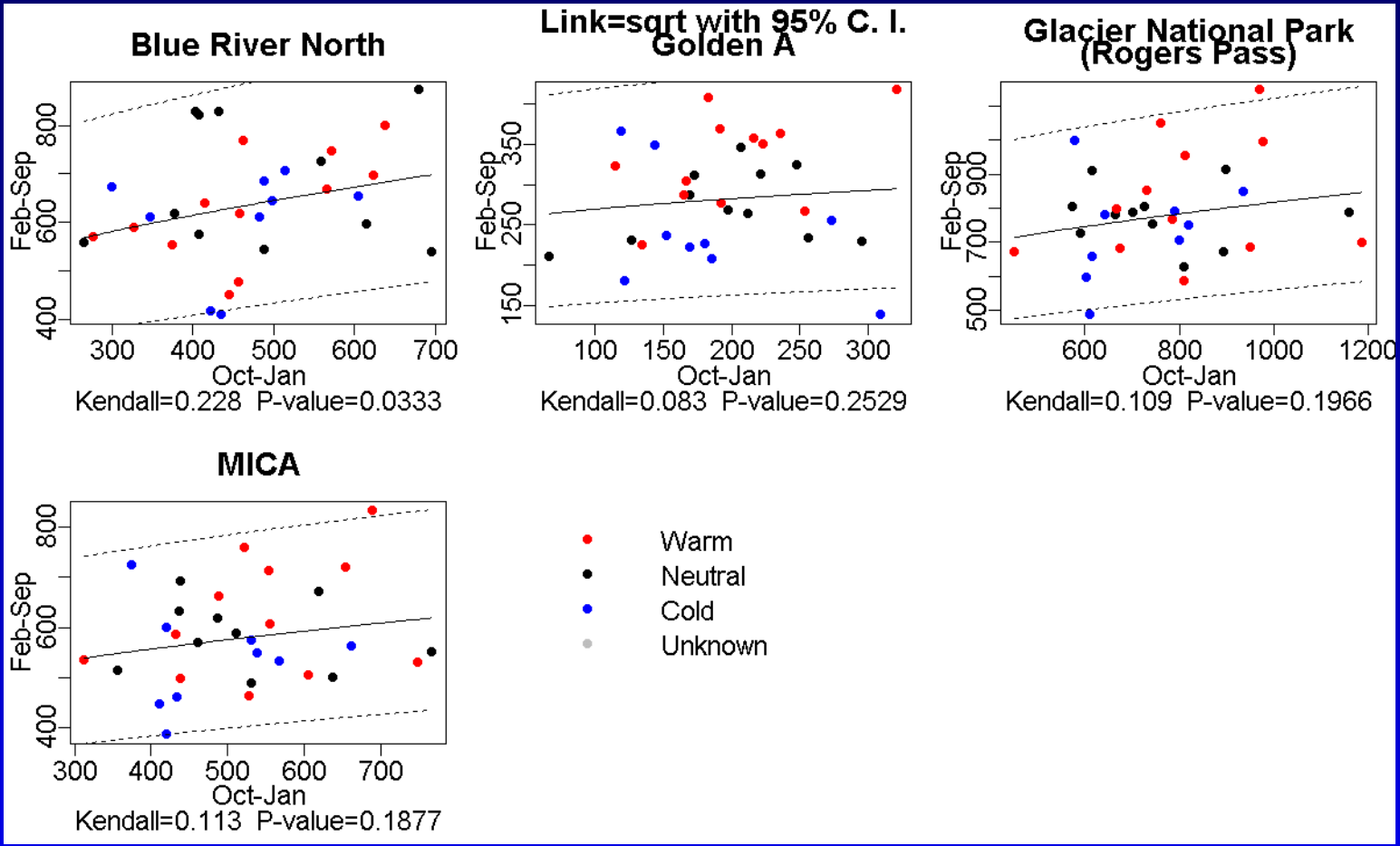
Resutls


Link=sqrt with 95% C. I.
Agassiz
Feb-Jul
Oct-Jan
Kendall=0.198 P-value=0.0011
Creston
Feb-Jul
Oct-Jan
Kendall=0.200 P-value=0.0033
Ft. St. James
Feb-Jul
Oct-Jan
Kendall=0.121 P-value=0.0353
Golden A
Feb-Jul
Oct-Jan
Kendall=0.105 P-value=0.0934
Shawnigan
Feb-Jul
Oct-Jan
Kendall=0.157 P-value=0.0181
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000

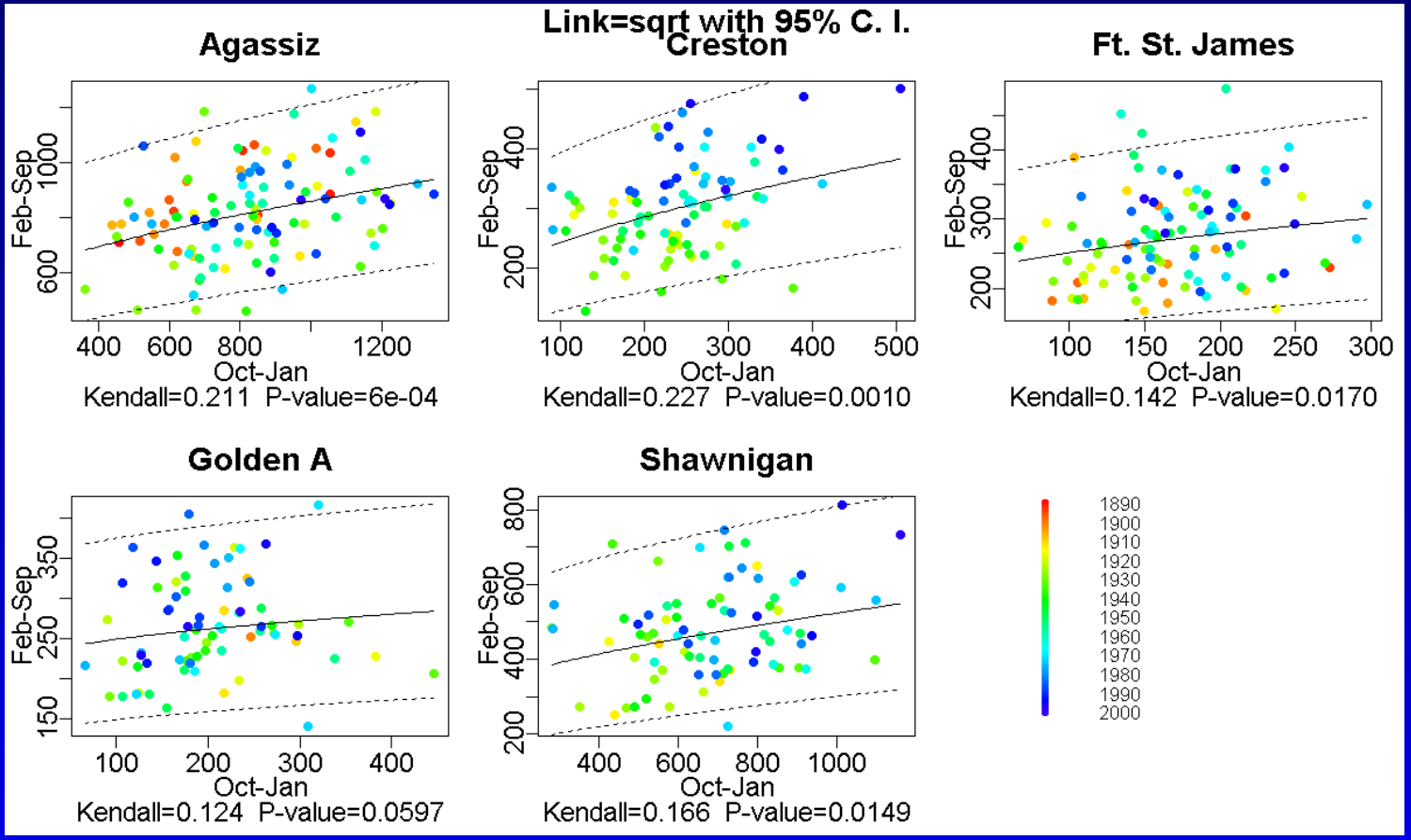
Results


Link=sqrt with 95% C. I.
Agassiz
Creston
Ft. St. James
Feb-Sep
Oct-Jan
Kendall=0.211 P-value=6e-04
Kendall=0.227 P-value=0.0010
Kendall=0.142 P-value=0.0170
Golden A
Shawnigan
Kendall=0.124 P-value=0.0597
Kendall=0.166 P-value=0.0149
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000

Results


Blue River North
Feb-Sep
Oct-Jan
Kendall=0.228 P-value=0.0333
Link=sqrt with 95% C. I.
Golden A
Feb-Sep
Oct-Jan
Kendall=0.083 P-value=0.2529
Glacier National Park
(Rogers Pass)
Feb-Sep
Oct-Jan
Kendall=0.109 P-value=0.1966
MICA
Feb-Sep
Oct-Jan
Kendall=0.113 P-value=0.1877
Warm
Neutral
Cold
Unknown

Results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Feb-Sep
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1890
1900
1910
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1970
1980
1990
2000

Summary and Conclusions

- **Study suggested *"strong evidence of weak persistence"* of Oct-Jan precipitation to subsequent months**
- **Persistence, if any, has already been incorporated in MLR model**
- **Future studies:**
  - **Causes: ENSO, PDO, climate change?**
  - **Review stationarity of Creston data**
  - **Precipitation of other periods**
  - **Can evidence on persistence be used to improve ESP water supply forecast?**